

Serial No.: 09/553,374
Amendment dated: May 25, 2004
Reply to Office Action of: March 23, 2004
Atty. Docket No.: GJH-0019 (P1998J107A)

REMARKS

Applicants request that the Examiner enter all amended claims in order to place this application in condition for allowance or in better form for appeal.

Claim 1 has been amended to include the limitation that at least a portion of the hydrogen-containing treat gas used in the first hydrodesulfurization stage is once-through hydrogen containing treat gas supplied from a source other than the present multi-stage process. Support for this amendment can be found on page 6, last 2 lines and page 8, second paragraph, first 2 lines of the instant specification.

Claim 1 has also been amended to include the limitation that the process includes a stripping stage between the second hydrodesulfurization stage and the aromatics hydrogenation reaction stage. Support for this amendment can be found on page 5, second paragraph of the instant specification and original claim 17, as filed.

Claim 1 has also been amended to include the limitation that the aromatics hydrogenation reaction stage contains two or more reaction zones operated at different temperatures wherein at least one of the two or more reaction zones is operated at a temperature at least about 25°C lower than the other reaction zones. Support for this amendment can be found in original claim 13, as filed, and page 14, second paragraph of the instant specification.

Claims 14 and 15 have been amended to depend from claim 1 because their original dependency was from claim 13, now cancelled.

FIRST REJECTION UNDER 35 U.S.C. 103(a)

Claims 1-7, 10-15, and 18-23, and 25-26 have been rejected under 35 U.S.C. 103(a) as being obvious over United States Patent Number 5,292,428, Harrison et al. ("Harrison") in view of United States Patent Number 5,516,342, Cherpeck ("Cherpeck").

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EXAMINER'S POSITION

The Examiner takes the position that Harrison teaches a process wherein a hydrocarbon feedstock is passed through two or more hydrodesulfurization zones connected in a series. Each of these two or more hydrodesulfurization zones contains a packed bed of solid catalyst wherein the liquid is passed from a first zone to the next until hydrodesulfurization zone other than the first zone. Hydrogen-containing gas is recovered from a subsequent hydrodesulfurization zone; target sulfur levels, etc. are obtained. The Examiner believes that Harrison et al. teaches a process and composition that reasonably appears to be either the same or an obvious variation of the instantly claimed product and composition. However, the Examiner acknowledges that Harrison differs from the instant claims in that Harrison does not disclose the addition of functional additives to the processed feedstock. Thus, the Examiner has cited Cherpeck Col. 1, lines 14-26 because the Examiner takes the position that this portion of Cherpeck teaches that it is well known that automobile engines tend to form deposits on the surface of engine components and fuel detergents or "deposit control" additives prevent or control such deposits.

APPLICANTS' POSITION

It is applicants' position that one having ordinary skill in the art and knowledge of Harrison and Cherpeck at the time the invention was made would not have found it obvious to arrive at the presently claimed invention.

As amended, the present invention is a multi stage process for hydrodesulfurizing and hydrogenating a distillate feedstock having a sulfur content greater than about 3,000 wppm. In the first hydrodesulfurization reaction stage, at least a portion of the hydrogen-containing treat gas used in the first hydrodesulfurization reaction stage is once-through hydrogen containing treat gas supplied from a source other than the present multi-stage process is used. Thus, the present process now claims the use of make-up hydrogen in the first hydrodesulfurization reaction stage. Also, as amended, the present invention

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also employs a stripping stage between the second hydrodesulfurization reaction stage and the aromatics hydrogenation reaction stage.

The use of make-up hydrogen in the first reaction stage, as is presently claimed, is taught away from in Harrison. As stated at col. 8, lines 22-24 make up hydrogen in the Harrison process is added to a "hydrodesulfurization zone other than the first hydrodesulfurization reaction zone", see also col. 11, lines 37-40. Also, when referring to the Figures therein, Harrison teaches that the hydrogen in the first hydrodesulfurization reaction stage therein is from another part, i.e. a recycle from a subsequent reaction stage, is used, see, e.g., col. 13, lines 17-18 of Harrison.

As stated above, the present invention also employs a stripping stage between the second hydrodesulfurization reaction stage and the aromatics hydrogenation reaction stage. There is no teaching in Harrison to employ a stripping stage between a hydrodesulfurization stage and an aromatics hydrogenation stage.

Thus, applicants take the position that neither Harrison nor Cherpeck, alone or in combination, obviate the presently claimed invention. Neither Harrison nor Cherpeck teaches to use make-up hydrogen in a first hydrodesulfurization reaction stage. To the contrary, Harrison teaches away from the use of make-up hydrogen in the first hydrodesulfurization reaction stage. Likewise, neither Harrison nor Cherpeck utilizes a stripping stage between a hydrodesulfurization reaction stage and an aromatics hydrogenation reaction stage.

The Examiner is requested to reconsider and withdraw this rejection.

SECOND REJECTION UNDER 35 U.S.C. 103(a)

Claims 16 and 17 have been rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Number 5,292,428, Harrison et al. (Harrison) in view of United States Patent Number 5,114,562, Haun et al. (Haun).

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EXAMINER'S POSITION

Harrison is relied on by the Examiner as above but differs from the instant claims in not teaching a countercurrent aromatics hydrogenation stage or stripping of the liquid stage prior to the aromatics stage.

Haun is cited as teaching countercurrent aromatics hydrogenation and stripping of the liquid stage prior to the aromatics stage. The Examiner further states that Haun teaches a mineral oil conversion process that includes hydrodesulfurization and hydrogenation steps performed in separate reaction zones whereas the instantly claimed invention relates to the hydrogenation of distillate petroleum fractions to produce low sulfur content products. Desulfurization conditions employed are those customarily employed in the art for desulfurization of equivalent feedstocks and the effluent stream of the desulfurization zone is stripped with a stream of hydrogen-rich gas prior to being fed to the hydrogenation zone. The Examiner also mentions that the vapor phase stream from the hydrogenation step in Haun is highly rich in hydrogen and relatively low in hydrogen sulfide and is "cascaded" to the hydrodesulfurization zone and that hydrogen-rich gas may flow countercurrent to the liquid-phase hydrocarbons through one or more reaction zones.

APPLICANTS' POSITION

Claim 17 has been cancelled. Claim 16 is a dependent claim, and therefore, includes all of the limitations of the claims from which they depend. Therefore, Claim 16 includes all of the limitations of independent Claim 1. More importantly, Claim 16 includes all of the limitations of presently amended claim 1.

As discussed above, the present invention, as amended, is a multi stage process for hydrodesulfurizing and hydrogenating a distillate feedstock having a sulfur content greater than about 3,000 wppm. In the first hydrodesulfurization reaction stage, at least a portion of the hydrogen-containing treat gas used in the first hydrodesulfurization reaction stage is once-through hydrogen containing treat gas supplied from a source other than the present multi-stage process is used. Thus, the present process now claims the

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use of make-up hydrogen in the first hydrodesulfurization reaction stage. Also, as amended, the present invention also employs a stripping stage between the second hydrodesulfurization reaction stage and the aromatics hydrogenation reaction stage.

The use of make-up hydrogen in the first reaction stage, as is presently claimed, is taught away from in Harrison. As stated at col. 8, lines 22-24 make up hydrogen in the Harrison process is added to a "hydrodesulfurization zone other than the first hydrodesulfurization reaction zone", see also col. 11, lines 37-40. Also, when referring to the Figures therein, Harrison teaches that the hydrogen in the first hydrodesulfurization reaction stage therein is from another part, i.e. a recycle from a subsequent reaction stage, is used, see, e.g., col. 13, lines 17-18 of Harrison.

Therefore, the Examiner is requested to reconsider and withdraw this rejection.

Based on the preceding arguments and amendments, the Examiner is requested to reconsider and withdraw all rejections and pass this application to allowance. The Examiner is encouraged to contact applicants' attorney should the Examiner wish to discuss this application further.

Respectfully submitted:

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